

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 09/662,849 Confirmation No. : 2146

First Named Inventor : Martin SCHUESSLER

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Examiner : N. Bhat

Docket No. : 102063.49153

Customer No. : 23911

Title : System for Heating and/or Converting at Least One Medium

APPEAL BRIEF

Mail Stop Appeal Brief- Patents

Commissioner for Patents

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Sir:

On June 18, 2008, Appellant appealed to the Board of Patent Appeals from the final rejection of claims 1-4, 6 and 8-18. The following is Appellant's Appeal Brief submitted pursuant to 37 C.F.R. § 1.192.

I. REAL PARTY IN INTEREST

The real party in interest is NuCellSys GmbH.

II. RELATED APPEALS AND INTERFERENCES

Appellant is not aware of any appeals, interferences or other proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-4, 6 and 8-18 remain pending and are the subject of this appeal.
Claims 5 and 7 have been cancelled.

IV. STATUS OF AMENDMENTS

Appellant has not submitted any amendments subsequent to the final
Office Action dated February 21, 2008.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Exemplary embodiments of the present invention are directed to a system for heating and/or converting at least one medium. As illustrated in Figure 2 of the present application (reproduced below), the system can include, for example, an evaporator function area 3' and a lower reaction area 3" that is constructed as a reactor.¹

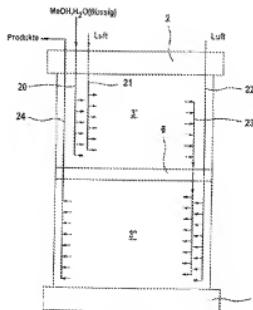


Fig. 2

Due to the different thermal conditions required for evaporator function area 3' and reactor 3", these areas are separated by insulating plate 6.²

¹ Page 9, lines 16-20.

² Page 9, lines 20-24.

As illustrated in Figure 1 of the present application (reproduced below), each of the function areas 3 comprises a number of layers 3a.

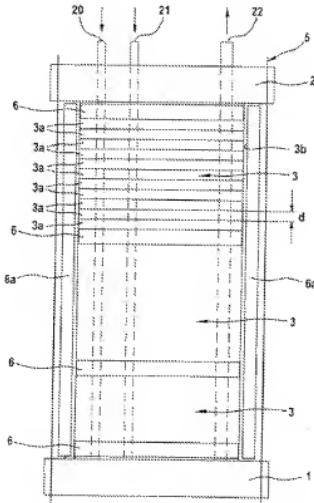


Fig. 1

In order to provide a favorable mechanical stability, the reaction areas at the upper and lower periphery of the system are bounded by upper and lower plates 1, 2.³ Insulators 6 are arranged between end plates 1, 2 and the layers 3a that are respectively adjacent to the end plates in order to thermally uncouple the end plates 1, 2 from the function areas.⁴ Thus, a desired operating temperature can be reached more rapidly in the function areas. The arrangement of insulators 6 with respect to the end plates 1, 2 also allows the

³ Page 4, lines 10-12.

⁴ Page 4, lines 20-24.

use of end plates made of aluminum because the aluminum end plates can have good mechanical stability due to the lower temperatures provided by the decoupling from the function areas.⁵

Appellant's claim 1 is directed to a modular system for heating or converting at least one medium.⁶ The system includes at least a reactor 3" and a heat exchanger 3', having layers 3a arranged in a stack which layers are formed by the pressing of catalyst material.⁷ The stack includes separator devices 6 which divide it into a plurality of function areas.⁸ The layers 3a are arranged between a lower end plate 1 and an upper end plate 2.⁹ Insulating plates 6 are provided between the end plates and layers which are respectively adjacent to the end plates.¹⁰

Appellant's claim 8 depends from claim 1 and further recites that the end plates are made of aluminum.¹¹

Appellant's claim 9 depends from claim 1 and further recites that the system includes devices 5 for clamping the layers between the two end plates.¹²

Appellant's claim 10 depends from claim 9 and further recites that the devices for the clamping are formed by tie rods.¹³

⁵ Page 5, lines 1-4.

⁶ Figures 1-3.

⁷ Figures 1-3, and page 9, lines 15-24.

⁸ *Id.*

⁹ Figures 1-3 and page 8, lines 5-8.

¹⁰ *Id.*

¹¹ Page 5, lines 1-4.

¹² Figure 1, page 5, lines 6-16 and page 8, lines 5-8.

Appellant's claim 13 recites a system including at least one of an evaporator, a reactor and a heat exchanger for heating or converting at least one medium.¹⁴ The system includes a plurality of layers 3a of pressed catalyst material arranged in a stack and a plurality of separator 6 devices which divide said stack into a plurality of function areas.¹⁵ The system also includes a lower end plate 1 and an upper end plate 2 arranged at upper and lower extremities of said stack and insulating plates 6 provided between the end plates 1, 2 and respective adjacent layers of said stack.¹⁶ The system further includes devices 5 for clamping the layers between the two end plates and an insulation layer 6a insulating said stack from a surrounding environment, said insulation layer being formed separately from said stack and laterally surrounding the stack.¹⁷

Appellant's claim 14 depends from claim 13 and further recites that the end plates and the devices for clamping in the layers are provided outside a thermally insulated area defined by outer insulating plates and insulation.¹⁸

Appellant's claim 17 depends from claim 1 and further recites that the system includes an insulation layer 6a insulating said stack from a surrounding environment, said insulation layer being formed separately from said stack and laterally surrounding the stack.¹⁹

¹³ *Id.*

¹⁴ Figures 1-3.

¹⁵ Figures 1-3 and page 8, lines 1-8.

¹⁶ *Id.*

¹⁷ Figure 1, page 5, lines 6-16 and page 8, lines 10-14.

¹⁸ Figure 1 and

¹⁹ Figure 1 and page 8, lines 10-14.

VI. GROUNDS OF REJECTION TO BE REVIEW ON APPEAL

The one ground of rejection for review on this appeal is whether the Patent Office has satisfied the burden of establishing that claims 1-4, 6 and 8-18 are obvious rejected under 35 U.S.C. § 103(a) in view of U.S. Patent No. 6,447,736 to Autenrieth et al. ("Autenrieth").

VII. ARGUMENT

The rejection of Appellant's claims relies exclusively upon Autenrieth to support the conclusion of obviousness. Autenrieth, however, is completely silent with respect to at least six (6) different elements of Appellant's claims, and the Patent Office has not provided the necessary clearly articulated reasoning and factual support for the *prima facie* conclusion of obviousness.

A. Autenrieth is Completely Silent With Respect to Six (6) Different Claim Elements

Autenrieth is completely silent with respect to the following claim elements:

1. insulating plates provided between the upper and lower end plates and the adjacent layers (claims 1 and 13);
2. an insulation layer formed separately from the stack and laterally surrounding the stack (claims 13 and 17);
3. end plates made of aluminum (claim 8);
4. devices for clamping the layers between the two end plates (claims 9 and 13);

5. the devices for the clamping are formed by tie rods (claim 10); and
6. the end plates and the devices for clamping in the layers are provided outside a thermally insulated area defined by outer insulating plates and insulation (claim 14).

Autenrieth discloses a system for water vapor reforming of a hydrocarbon that includes a modular reactor unit composed of stacked plates. Autenrieth makes clear that the system should have "a very compact construction" and should be a relatively low weight.²⁰ As illustrated in Figure 1 of Autenrieth (reproduced below), the system of Autenrieth includes an evaporator/burner module 9 that adjoins an oxidation stage/performing module 12.²¹

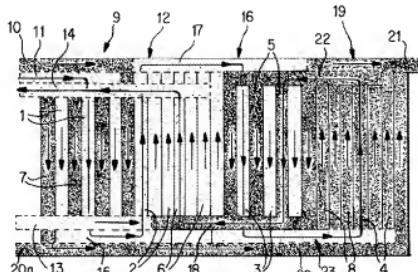


Fig.1

In the second embodiment of Autenrieth (illustrated in Figure 2 reproduced below) insulating plates 24 are arranged *between different functional*

²⁰ See, for example, column 1, lines 16-19; column 2, lines 29-35; column 5, lines 1-2 and 25-37.

²¹ Column 3, lines 66 and 67.

modules (i.e., between evaporator/burner module 9 and oxidation stage/performing module 12).

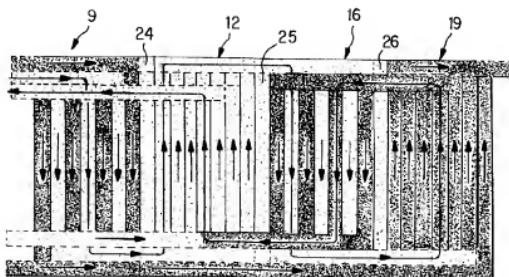


Fig. 2

Notably absent from Autenrieth is any discussion of "end plates". Instead, the modular reactor of Autenrieth is bounded by modules, namely evaporator/burner module 9 and reformer/burner module 19. Accordingly, there is no explicit or inherent disclosure in Autenrieth of the end plates recited in claims 1 and 13. This absence of an express or inherent disclosure of end plates also means that Autenrieth does not include an express or inherent disclosure of end plates made of aluminum as recited in Appellant's claim 8.

Because Autenrieth does not contain an explicit or inherent disclosure of end plates, Autenrieth also does not include an explicit or inherent disclosure of insulating plates provided between the upper and lower end plates and the adjacent layers as recited in Appellant's claims 1 and 13.

Also notably absent from the disclosure of Autenrieth is any mention of insulation that surrounds the stack of plates that comprise the system of Autenrieth. Thus, Autenrieth does not include an express or inherent disclosure of an insulation layer formed separately from the stack and laterally surrounding the stack as recited in Appellant's claims 13 and 17.

Finally, the disclosure of Autenrieth fails to mention devices for clamping. Thus, Autenrieth does not include an express or inherent disclosure of devices for clamping the layers between the two end plates as recited in claims 9 and 13. Hence, Autenrieth also does not include an express or inherent disclosure that the devices for clamping are formed by tie rods as recited in claim 10 or that the end plates and the devices for clamping in the layers are provided outside a thermally insulated area defined by outer insulating plates and insulation as recited in claim 14.

B. The Patent Office Has Failed to Meet its Initial Burden of Factually Supporting a Prima Facie Conclusion of Obviousness

It appears that the final Office Action recognizes that Autenrieth does not include an express or inherent disclosure of the six (6) claim elements set forth above, but instead concludes, without any factual support or clearly articulated reasoning, that these claim elements are obvious from the disclosure of Autenrieth.

Appellant is entitled to a patent unless the Patent Office provides evidence otherwise. Specifically, "The examiner bears the initial burden of factually

supporting any *prima facie* conclusion of obviousness.”²² Both the Supreme Court and the Federal Circuit have made clear that “rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”²³

1. The Final Office Action Fails to Provide Clearly Articulated Reasoning to Support the Obviousness Rejection

The final Office Action demonstrates that the rejection of Appellant’s claims is based upon conclusory statements, instead of articulated reasoning.

For example, the final Office Action states that:

With respect to the end plate, although not expressly taught this is implicitly suggested by the modular construction and insulating plate as described by the reactor to specifically use the end plate between modules would have been obvious to one having ordinary skill.²⁴

Here, instead of providing any clear articulation of why it would have been obvious to include the end plates of Applicant’s claimed invention in the system of Autenrieth, the Office Action merely concludes that it would have been obvious because it “is implicitly suggested.” Why it is implicitly suggested is not explained. This conclusory statement is not consistent with the clearly articulated reasoning standard set forth by the Supreme Court and the Federal Circuit.

²² M.P.E.P. § 2142.

²³ See M.P.E.P. § 2142 citing *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). See also *KSR*, 550 U.S. at ___, 82 USPQ2d at 1396 (quoting Federal Circuit statement with approval).

²⁴ Page 4.

The final Office Action also states that:

With respect to the material, of the end plate being aluminum, and artisan familiar with reactor design and heat exchange would be able to recognize form the teachings of Autenrieth et al. to select a particular plate material for constructing the reactor and evaporator/heat exchange modular systems.²⁵

As discussed above, Autenrieth does not disclose or suggest arranging insulating plates between the end plates and the layers respectively adjacent to the end plates. Without such insulating plates, one skilled in the art would not have found it obvious to use aluminum end plates because these types of end plates, without insulating plates, would not provide good mechanical stability. Furthermore, this statement in the Office Action is merely conclusory, and does not provide the required clearly articulated reasoning as to why one skilled in the art would select aluminum end plates.

Regarding the devices for clamping, the tie rods and the sealing arrangements recited in Appellant's claims, the final Office Action states that:

these limitations would have been an obvious design choice to one familiar with providing modular stack type reactors absent criticality in showing.²⁶

Again, this conclusory statement does not include a clearly articulated reason why this would have been obvious. This is particularly necessary in this case where Autenrieth includes no disclosure or suggestion of any type of clamping arrangement or the arrangement of the particular seals recited in

²⁵ *Id.*

²⁶ *Id.*

Appellant's claims. Instead of attempting to establish the initial burden required of a *prima facie* case of obviousness, the Patent Office is attempting to shift the burden to the Appellant to prove non-obviousness. Until the Patent Office has provided the required clearly articulated reasoning, this burden shifting is improper.

It also appears that the Patent Office is not considering the actual claim recitations. Specifically, Appellant's claim 1 recites the arrangement of insulating plates between *end plates* and layers which are respectively adjacent to the end plates. In response the Office Action states:

It is maintained that the prior art does teach and suggest placing an insulating plate between function areas and the positioning of the insulating plate would have been obvious to one having ordinary skill in the art absent criticality in showing.²⁷

Appellant's arguments with regard to Autenrieth are not that there is no disclosure or suggestion of insulating plates, but instead of the particular arrangement of the insulating plates. Merely disclosing insulating plates *between* functional areas does not, however, disclose or suggest the specific arrangement recited in Appellant's claim 1. Furthermore, shifting the burden to the Appellant to prove criticality without a clearly articulated reasoning for the conclusion of obviousness is not proper. Finally, Appellant's specification specifically describes that the particular arrangement of insulating plates with respect to the end plates

²⁷ Page 5.

ensur[es] that the end plates can be thermally uncoupled from the plates forming the media spaces, so that a desired operating temperature can be reached more rapidly in the media spaces.²⁸

Because Appellant's own specification describes the criticality of the claimed arrangement of insulating plates with respect to the end plates, and the Patent Office has not provided any clearly articulated reasoning why this arrangement would have been obvious in view of Autenrieth, the Examiner has not met his initial burden of establishing a *prima facie* case of obviousness.

2. The Advisory Action Fails to Provide Clearly Articulated Reasoning to Support the Obviousness Rejection

The Advisory Action states as follows:

Although the examiner recognizes that Autenrieth et al. do not teach the end plates and the construction of the end plates and tie rods, the stacked reactor construction which is modular in design would inherently be housed in a container or housing, the stacked layers are not freely floating, the orientation of the layers as well as the feed inlets and outlets are such that there are ends on the reactor or a housing which would function as the end plates.

Even if it were assumed that the stacked reactor of Autenrieth inherently includes ends that would function as end plates, this does not lead to the conclusion that it would have been obvious to include insulating plates are provided between the end plates and layers which are respectively adjacent to the end plates. This is particularly true where Autenrieth only discloses the use of insulating plates *between* functional areas, and not outside of the functional areas, such as between the outside of a functional area and the environment.

²⁸ Page 4, lines 20-24.

Finally, the remainder of the arguments in the Advisory Action address why the undisclosed housing that is asserted to be a required part of the system of Autenrieth suggests the claimed end plates and tie rod system. If, as the Patent Office has repeatedly argued, the specific arrangement of insulating plates with respect to end plates and the clamping arrangement are so inherent or obvious from the disclosure of Autenrieth then it should have been easy for the Patent Office to produce a secondary reference that could be combined with Autenrieth to result in the claimed invention. The Patent Office, however, appears to be of the position that an obviousness rejection does not require prior art that discloses or suggests all of the claim elements, and also that there is no need to provide a clearly articulated reason why, in the absence of such prior art disclosure, the person of ordinary skill in the art would have found Appellant's claimed arrangement obvious. This position is clearly contrary to the law of obviousness as interpreted by both the Supreme Court and the Federal Circuit.

VIII. CONCLUSION

For at least those reasons set forth above, it is respectfully submitted that the obviousness rejection should be reversed.

The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, to Deposit Account No. 05/1323, Docket No.: 102063.49153US.

Respectfully submitted,

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CLAIMS APPENDIX

1. A modular system for heating or converting at least one medium, said system comprising at least a reactor and a heat exchanger, having layers arranged in a stack which layers are formed by the pressing of catalyst material, wherein the stack includes separator devices which divide it into a plurality of function areas, the layers are arranged between a lower end plate and an upper end plate, and insulating plates are provided between the end plates and layers which are respectively adjacent to the end plates.

2. The system according to Claim 1, wherein the at least one medium can be pressed through the layers, with a resulting pressure drop.

3. The system according to Claim 1, wherein the at least one medium flows over the layers, with a resulting pressure drop.

4. The system according to Claim 1, wherein said separator devices comprise insulating plates which divide the stacked layers into thermally mutually insulated function areas.

5. (Canceled)

6. The system according to Claim 4, wherein said insulating plates extend essentially parallel to the layers.

7. (Canceled)

8. The system according to Claim 1, wherein the end plates are made of aluminum.

9. The system according to Claim 1, further comprising devices for clamping the layers between the two end plates.

10. The system according to Claim 9, wherein the devices for the clamping are formed by tie rods.

11. The system according to Claim 1, wherein edge areas of the layers are sealed off with respect to the environment.

12. The system according to Claim 1, wherein function areas of a high temperature are formed in an interior of the stack.

13. A system including at least one of an evaporator, a reactor and a heat exchanger for heating or converting at least one medium, said system comprising:

a plurality of layers of pressed catalyst material arranged in a stack;
a plurality of separator devices which divide said stack into a plurality of function areas;
a lower end plate and an upper end plate arranged at upper and lower extremities of said stack;
insulating plates provided between the end plates and respective adjacent layers of said stack;
devices for clamping the layers between the two end plates; and
an insulation layer insulating said stack from a surrounding environment, said insulation layer being formed separately from said stack and laterally surrounding the stack.

14. The system according to Claim 13, wherein the end plates and the devices for clamping in the layers are provided outside a thermally insulated area defined by outer insulating plates and insulation.

15. The system according to Claim 1, further comprising at least one of:
educt ducts which extend through at least a portion of the layers, by way of which educt ducts individual function areas can be selectively acted upon by respective educts;
connection ducts which extend through at least a portion of the layers, by way of which connection ducts educts or products can be transferred from a first function area into a second function area;

product ducts which extend through at least a portion of the layers, by way of which product ducts heated educts and reaction products can be removed from the respective function areas.

16. The system according to Claim 13, further comprising, different educt ducts which selectively communicate with respective function areas for admitting an identical educt to different function areas, and different product ducts for removing the products from the respective function areas.

17. The system of claim 1, further comprising:
an insulation layer insulating said stack from a surrounding environment, said insulation layer being formed separately from said stack and laterally surrounding the stack.

18. The system of claim 13, further comprising:
seals arranged between the plurality of layers.

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EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None